

Serial No. 10/086,931

4296-150 US

Amendments to the Claims:

Claim Listing:

1. Cancelled.
2. Cancelled.
3. Cancelled.
4. (Currently amended) A method for distilling a raw material liquid containing (meth)acrylic acid substantially free from azeotropic solvents, which comprises;

subjecting gas phase catalytic oxidation reaction of propylene and/or acrolein with a molecular oxygen-containing gas or by gas phase catalytic oxidation reaction of at least one selected from the group consisting of isobutylene, t-butyl alcohol and methacrolein with the molecular oxygen-containing gas to form a mixed gas;

feeding the resulting mixed gas to a (meth)acrylic acid collection column wherein materials containing (meth)acrylic acid are collected with a collection agent to form the raw material liquid containing (meth)acrylic acid substantially free from azeotropic solvents;

feeding to a distillation column the raw material liquid containing (meth)acrylic acid substantially free from azeotropic solvents which temperature is substantially equal to that of an entrance place in the column; and

distilling the raw material liquid in the distillation column,

wherein ~~a~~ the temperature of the raw material liquid is adjusted by heating or cooling.

5. (Currently amended) A method for distilling a raw material liquid containing (meth)acrylic acid substantially free from azeotropic solvents, which comprises;

subjecting gas phase catalytic oxidation reaction of propylene and/or acrolein with a molecular oxygen-containing gas or by gas phase catalytic oxidation reaction of at least one selected from the group consisting of isobutylene, t-butyl alcohol and methacrolein with the molecular oxygen-containing gas to form a mixed gas;

feeding the resulting mixed gas to a (meth)acrylic acid collection column wherein materials containing (meth)acrylic acid are collected with a collection agent to form the raw material liquid;

Serial No. 10/086,931

4296-150 US

feeding to a distillation column the raw material liquid containing (meth)acrylic acid substantially free from azeotropic solvents which temperature is substantially equal to that of an entrance place in the column; and

distilling the raw material liquid in the distillation column,

wherein ~~a~~the temperature of the raw material liquid to be fed (T0) and a temperature of the entrance place in the distillation column (T1) fulfill the following formula (1a):

$$0^{\circ} \text{C} \leq |T0 - T1| \leq 30^{\circ} \text{C} \quad (1a).$$

6. (Previously amended) A method according to claim 5, wherein the temperature of the raw material liquid to be fed (T0) and the temperature of the entrance place in the distillation column (T1) fulfill the following formula (1b):

$$0^{\circ} \text{C} \leq |T0 - T1| \leq 20^{\circ} \text{C} \quad (1b).$$

7. (Previously amended) A method according to claim 5, wherein the temperature of the raw material liquid to be fed (T0) and the temperature of the entrance place in the distillation column (T1) fulfill the following formula (1c):

$$0^{\circ} \text{C} \leq |T0 - T1| \leq 10^{\circ} \text{C} \quad (1c).$$

8. (Currently amended) A method for distilling a raw material liquid containing (meth)acrylic acid substantially free from azeotropic solvents, which comprises;

subjecting gas phase catalytic oxidation reaction of propylene and/or acrolein with a molecular oxygen-containing gas or by gas phase catalytic oxidation reaction of at least one selected from the group consisting of isobutylene, t-butyl alcohol and methacrolein with the molecular oxygen-containing gas to form a mixed gas;

feeding the resulting mixed gas to a (meth)acrylic acid collection column wherein materials containing (meth)acrylic acid are collected with a collection agent to form the raw material liquid;

feeding to a distillation column the raw material liquid containing (meth)acrylic acid substantially free from azeotropic solvents which temperature is substantially equal to that of an entrance place in the column; and

Serial No. 10/086,931

4296-150 US

distilling the raw material liquid in the distillation column, wherein a fluctuation range (ΔT_0) of temperature (T_0) of the raw material liquid is within 10° C.

9. (Original) A method according to claim 1, wherein a fluctuation range (ΔT_0) of temperature (T_0) of the raw material liquid is within 5° C.

10. (Previously amended) A method according to claim 8, wherein the fluctuation range (ΔT_0) of temperature (T_0) of the raw material liquid is within 3° C.

11. (Original) A method according to claim 4, wherein the heating or cooling is performed by a heat exchanger.

12. (Currently amended) A method according to claim 4, wherein the heating or cooling is performed based on the result that ~~a~~the temperature of the entrance place in the column is measured.

13. (Previously amended) A method according to claim 5, wherein the temperature of the raw material liquid to be fed to the column is lower than that of a bottom part in the column.

14. (Previously amended) A method according to claim 5, wherein the raw material liquid is divided into two or more separate streams, and then fed to the distillation column.

15. (Previously amended) A method according to claim 5, wherein the collection agent is water or a process wastewater.

16. (Currently amended) A method according to claim ~~15~~, ~~wherein the raw material liquid is distilled~~ distilling before said step of feeding to a distillation column the raw material liquid, removing the azeotropic solvent from the raw material liquid to form the raw material liquid containing (meth)acrylic acid substantially free from azeotropic solvents by employing an azeotropic solvent to separate the collection agent therefrom.

17. (Original) A method according to claim 16, wherein the azeotropic solvent is at least one selected from the group consisting of diethyl ketone, methyl propyl ketone, methyl isobutyl ketone, methyl-t-butyl ketone, n-propyl acetate, toluene, heptane, and methylcyclohexane.

18. (Previously amended) A method according to claim 5, wherein the distillation column is maintained under the following conditions:

Serial No. 10/086,931

4296-150 US

Operation pressure: 10 to 400 hPa

Top temperature of the column: 45° C to 110° C

Temperature at which the raw material liquid is fed to the entrance place in the column:
40° C to 120° C

Bottom temperature: 50° C to 190° C

Reflux ratio: 0.1 to 5.